

Amendments to the Drawings

The attached drawing sheet (one (1) total) includes a formal drawing for Fig. 12. The sheet, which includes Fig. 12, replaces the original sheet that included Fig. 12.

REMARKS

Claims 14-21 and 44-57 are currently pending. Claims 14 and 47 have been amended.

The Examiner objected to the drawings for informalities that have been corrected with this response. Specifically, Fig. 12 has been amended to add the reference characters 517A and 519A. In addition, the specification has been amended to refer to these new reference characters. No new matter has been added with the drawing or specification amendment.

The Examiner rejected claims 14-17, 21, 44-46, 48-50, and 54-57 under 35 U.S.C. § 103(a) as being unpatentable over Sopko (U.S. Patent No. 4,993,291) in view of Groswith (U.S. Patent No. 5,163,350) or Renfro (U.S. Patent No. 41,861).

Amended claim 14 defines a punch for punching a workpiece. The punch includes a four bar linkage including at least four members. At least one punch element is operably associated with a drive surface defined by a first member of the linkage. The drive surface defines a drive surface center. Upon actuation of the linkage, an arcuate motion of the drive surface produces an arcuate motion of the drive surface center and drives the punch element to punch a hole in the workpiece.

The arcuate motion of the drive surface is described on page 26, paragraph 88 and is illustrated in Fig. 13. Specifically, the specification notes “a drive surface 600 of drive member 512 moves arcuately. . . .” *Specification, page 26, para. 88*. The drive surface is preferably an arcuate surface of a push bar 510. *See Specification, page 26, para. 88*. The push bar 510 illustrated in Fig. 13 is a cylindrical bar that inherently defines a drive surface center that moves along an arcuate path 550 during actuation of the punch.

Sopko fails to teach or suggest a punch that includes a drive surface that defines a drive surface center and that upon actuation of the linkage, an arcuate motion of the drive

surface produces an arcuate motion of the drive surface center and drives the punch element to punch a hole in the workpiece. Rather, Sopko discloses a punch that includes a pivot shaft 171 that engages a horizontal bore 101 in a punch 27 to drive the punch 27 along a linear punch path “A”. The pivot shaft 171 is driven along the punch path “A” by a linkage in a way that causes the pivot shaft 171 to rotate slightly within the horizontal bore 101. Thus, while the outer surface of the pivot shaft 171 rotates slightly, the center of the pivot shaft 171, does not move in an arcuate fashion. Rather, the center of the pivot shaft moves linearly along the punch path “A”.

Growth does not cure the deficiencies of Sopko. Rather, Growth discloses a punch binding apparatus 10 that includes a four-bar linkage 32 attached to a lever arm 17, a punch blade 26, and a vertical plate 27. The four-bar linkage 32 includes a coupler plate 33, a link 34, and a short link 35. The coupler plate 33 includes a first point C connected to the link 34 which in turn is connected to a lever support extension 38. The short link 35 is connected to a second point E on coupler plate 33 and pivotally attaches at point B to the vertical plate 27. A third point D on the coupler plate 33 is a pin that connects to a punch blade 26 and extends through a vertical slot 41 in the vertical plate 27. As clearly shown in Fig. 18, when the lever arm 17 moves downwardly, point D moves vertically downward in a straight line within vertical slot 41 to drive the punch blade 26 vertically downward. Thus, Growth teaches a mechanism in which the drive surface (Point D) moves in a linear fashion to drive the punch member (the punch blade 26). In fact, Growth states “[v]ertical slots 41 and 41’ allow for passage of pins representing point D therethrough so that the pin and the punch plate attached thereto move vertically in a straight line.” *Col. 6, lines 31-34.*

Renfrew does not cure the deficiencies of Sopko. Rather, Renfrew discloses a metal punch that includes a frame A, and a linkage that connects the frame A to a shank B. The linkage is movable to drive a punch E. The linkage connects to the shank B at a pivot n. The pivot n moves in much the same way as the pivot shaft as taught by Sopko. Specifically, the pivot rotates slightly to drive the shank B in a substantially linear direction. Thus, the center of the pivot n also moves linearly, and does not move in an arcuate fashion. Both Sopko and Renfrew teach essentially the same movement between the pivot and the punch, with neither teaching an arcuate motion of the drive surface that produces an arcuate motion of the drive member center.

In light of the foregoing, Sopko, Groswith, and Renfrew alone or in combination do not teach or suggest each and every limitation of claim 14. As such, claim 14 is allowable. In addition, claims 15-21 and 44-46 depend from claim 14 and are allowable for these and other reasons.

Amended claim 47 defines a punch for punching a workpiece. The punch includes a four bar linkage including at least four members and a drive surface at least partially defined by a first member of the linkage. The drive surface defines a drive surface center. At least one punch element is in contact with the drive surface such that, upon actuation of the linkage, an arcuate motion of the drive surface produces an arcuate motion of the drive surface center and drives the punch element to punch a hole in the workpiece.

As discussed with regard to claim 14, Sopko, Groswith, and Renfrew alone or in combination do not teach or suggest a punch that includes a drive surface that defines a drive surface center and upon actuation of the linkage, an arcuate motion of the drive surface

produces an arcuate motion of the drive surface center and drives the punch element to punch a hole in the workpiece.

Both Sopko and Renfrew disclose punches that include a cylindrical member that engages a punch and rotates slightly during actuation of the punch. However, the center defined by the cylindrical members in both Sopko and Renfrew move linearly with the punch and do not move in an arcuate fashion. Similarly, Groswith teaches a linkage that is specifically designed to produce linear motion upon actuation.

In light of the foregoing, Sopko, Groswith, and Renfrew alone or in combination do not teach or suggest each and every limitation of claim 47. As such, claim 47 is allowable. In addition, claims 48-57 depend from claim 47 and are allowable for these and other reasons.

The Examiner rejected claims 14-21 and 44-57 under 35 U.S.C. § 103(a) as being unpatentable over Otsuka (U.S. Patent No. 3,921,487) in view of Groswith or Renfrew and further in view of Sopko.

As discussed, Sopko, Groswith, and Renfrew, alone or in combination, do not teach or suggest all of the limitations of claims 14 and 47.

Otsuka does not cure the deficiencies of Sopko, Groswith, and Renfrew. Otsuka does not teach or suggest, among other things, at least one punch element operably associated with a drive surface defined by a first member of the linkage, wherein the drive surface moves in an arcuate fashion to drive the punch element. Rather, Otsuka discloses a perforator that includes a perforated plate 8 adapted to receive a plurality of spaced punching rods 7. A rod guide member 12 receives the punching rods and guides them along a linear path. A rod actuation member 24 engages the punching rods 7 and moves along a linear path defined by the punching rod guide member extension 12''' to punch paper held in the punch. Thus,

Otsuka does not include a drive surface operably associated with the punching rods and movable in an arcuate fashion to drive the punching rods and punch a hole in a workpiece.

In light of the foregoing, Otsuka, Sopko, Groswith, and Renfrew, alone or in combination do not teach or suggest each and every limitation of claims 14 and 47. As such, claims 14 and 47 are allowable. In addition, claims 15-21 and 44-46, and 48-57 depend from claims 14 and 47 and are allowable for these and other reasons.

CONCLUSION

In light of the foregoing, Applicants respectfully submit that claims 14-21 and 44-57 are allowable.

The undersigned is available for telephone consultation during normal business hours.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'TJ Otterlee', with a stylized flourish at the end.

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